

Minimum Specifications for the Broadband TWT Amplifier with remote Power Supply

- A. 250 Watt CW/pulse gridded TWT amplifier, 8 to 18 GHz, with remote power supply.
- B. The TWT amplifier must be separated into two modules:
 - a. A “Power Supply” unit housing the high-voltage power supply subsystems.
 - b. A “RF Amplifier” unit housing the TWT device and appropriate supporting subsystems.
- C. The power supply must be housed in a rack-mountable enclosure compatible with a commercially available 19” equipment rack. The power supply plus the enclosure must weight no more than 125 lbs and must be air cooled with its own fan(s).
- D. The RF amplifier must be compact and lightweight compared to the power supply. The amplifier must not weigh more than 35 lbs and must not be larger than 8” wide x 12” tall x 24” deep. The amplifier must have mounting hardware such as brackets or flange for attaching to a plate without requiring access to the opposite side of the plate. It must be air-cooled with its own fan(s).
- E. The cable for connecting the power supply to the RF amplifier must be at least 2 meters in length. The cable must detach from the equipment at both ends and may use multiple connectors (i.e. separate high-voltage and low-voltage connectors). Two or more separate cables with separate connectors may be used for connecting the two units (i.e. one for high voltage and one for low voltage). In either case, the cables must be flexible and withstand repeated flexing.
- F. The cables for the power supply modules and RF amplifier modules must be interchangeable.
- G. Performance Specifications:

Criteria	Maximum	Minimum
Output power from 8 GHz to 18 GHz (P_{SAT})		250 W
Input power required to saturate output	1 mW (0 dBm)	
Gain		54 dB
Gain flatness	3 dB variation in any contiguous 1 GHz span in the band from 8 GHz to 18 GHz	
Noise Figure	24 dB	

Spurs	-50 dBc	
Output sample port	-30 dB	-50 dB
Duty Cycle	100%	0%
Output Power over 8 to 18 GHz, grid off	-30 dBm (-130 dBm/Hz)	
Output Power over 8 to 18 GHz, grid on, RF input terminated in 50 Ω	+33 dBm (-67 dBm/Hz)	
Grid on-off TTR/TTF	50 ns	
Grid control propagation delay	300 ns	
Input VSWR (50 Ω)	2.0:1	
Load VSWR (50 Ω)	2.5:1	
Ambient Temperature: Operating	50° C ¹	0° C
Ambient Temperature: Storage/Transit	60° C	-20° C
Altitude: operating or storage	10,000 ft. ASL (barometric equivalent)	0 ft. ASL

H. Prime power must be any of the three identified below: All must use appropriate NEMA plug connector.

- a. 110-120 VAC, 60 Hz, single phase, 20 A maximum continuous draw
- b. 220-240 VAC, 60 Hz, single phase, 20 A maximum continuous draw
- c. 208 VAC, 60 Hz, three-phase, 20 A per phase maximum continuous draw

I. Data Connectors

- a. RF input and sample output may be type N (preferred) or type SMA.
- b. Grid Control input must be type BNC.
- c. RF output must be WRD-750 waveguide
- d. Prime power connector must be per Section H.
- e. Data connector must be per Section J.

J. Data/Control Interface: The amplifier must have a data interface that provides at least a minimal level of status information about the amplifier operation. The Data/Control Interface Port must be located on either the power supply module or the RF amplifier module.

- a. The following minimum status information is required.
 - i. Power supply warmup/OK/fault.
 - ii. Power Supply temperature or temperature fault.
 - iii. TWT temperature or temperature fault.
- b. Additional status and control features are acceptable.
- c. The following are acceptable connection interfaces, listed in order of preference. Must provide at least one.
 - i. EIA-232 (RS-232, 9-pin or 25 pin)
 - ii. IEEE-488 (GPIB)
 - iii. RS-422/485 multidrop

- K. Grid Control Interface: The amplifier must have a grid control to support pulsed operation and “quiet” non-transmit states. The grid control input may be located on either the power supply module or the RF amplifier module. Must use one of the following electrical specifications:
- a. TTL (5 V standard), logic high = grid on
 - b. 50 Ω input, 0 V to 5 V levels, V_T between 1V and 4V, input > V_T = grid on

¹ Degradation of performance above 40° C is acceptable as follows: Noise/spurs may increase up to 10 dB, gain may decrease up to 6 dB, saturation power may decrease up to 3 dB.